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PATENT

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Applicant: PIUS GRUENENFELDER ET AL.

Serial No.: 08/902,331 Group Art Unit: 1753

Filed: APRIL 7, 1995 Examiner: G. Cantelmo

Title: MAGNETRON ATOMIZATION SOURCE AND METHOD OF USE THEREOF

DECLARATION OF WALTER HAAG

I, Walter Haag, declare and state as follows:

1. I am a named co-inventor in the above-identified application.

2. I am currently an employee of Unaxis Balzers AG, the assignee of this application. I have worked for the company, formerly known as Balzers AG for about 21 years.

3. My technical education was received at the Fachhochschule in Rüsselsheim, Germany, where I graduated from with a diploma in physical engineering. I am currently employed as a Manager R&D for coating sources.

4. My employment duties at Unaxis Balzers AG have been primarily in the design and development of sputtering equipment, including the design and development of magnetron atomization sources.

5. I have been named as an inventor in several U.S. and corresponding foreign patents in the sputtering field, among others U.S. Patent No. 5,733,419; 5,753,089; 5,997,697 and 6,068,742.

6. My technical training and professional work experience have given me first-hand familiarity with the level of ordinary skill of those designing and developing magnetron atomization sources prior to April 7, 1994. Based upon that knowledge, I can say without any qualification that one of ordinary skill in this art prior to April 7, 1994 would have been able to arrive at the target body taper range set forth in Claim 44 from our original disclosure using nothing more than basic computational skills and a basic understanding of geometry without any undue or unreasonable effort.

7. The attached Sketch A shows in simplified form the circular target body 1 shown in Fig. 1 of our above-identified application. In particular, the radius r_1 of the body is referenced at page 7, lines 12-14 and page 10, lines 11-14. Radius r_1 is also shown in Fig. 1. Likewise, the target body 1 also has a maximal thickness, d_1, as seen in Fig. 1 and also referenced at page 7, lines 12-14 of our disclosure. Of course, one of ordinary skill in the sputtering art will know that a "maximal" thickness related to the target body radius will also mean that it can have a lesser thickness at the edge.

8. Fig. 1 of the above-identified application and attached Sketch A both show the concave mirror shape of the new atomization surface F_1 as described at page 6 of our disclosure. The only parameter not originally designated by a letter or numeral in Fig. 1 is the amount of taper of that concave mirror shape 3b which was originally described as significantly thicker at its edge than at its center. We have merely referenced this taper in Claim 44 by the designation d_o and will now show how the range of values for d_o set forth in Claim 44 is easily ascertained from our original disclosure.

9. Page 9, line 15 to page 10, line 3 of our original Specification disclosed the following data without any question, namely

$$0.2\ \varnothing_{13} \leq d_{113} \leq 0.5\ \varnothing_{13} \qquad (1)$$

where d_{113} is, as seen in Fig. 1 the maximal distance between the new atomization surface to the surface to be coated. Inasmuch as $\varnothing_{13} = 2r_{13}$, then

$$0.4r_{13} \leq d_{113} \leq r_{13} \qquad (2)$$

The amount of the target taper d_o can be seen from Fig. 1 to be

$$d_o = d_{113} - a \qquad (3)$$

where a, a distance between the surface to be coated and the edge of the new atomization surface, is most preferably approximately 30% d_{113} as described at page 11, lines 14-15 of our disclosure. In other words, therefore,

$$d_o = d_{113} - 0.3\ d_{113} = 0.7\ d_{113} \tag{4}$$

whereby above equation (2) becomes

$$0.4\ r_{13} \leq \frac{1}{0.7}\ d_o \leq r_{13} \tag{5}$$

10. Page 10, lines 4-14 of our disclosure further teaches that r_1 is about 30% to 40% larger than the radius r_{13} of the workpiece to be coated. That is,

$$1.3r_{13} \leq r_1 \leq 1.4r_{13} \qquad \text{or} \tag{6}$$

$$r_{13\ min} = \frac{r_1}{1.4} \qquad \text{and } r_{13\ max} = \frac{r_1}{1.3} \tag{7}$$

Using the left-hand side of equation (5) as the lower limit and the right-hand side as the upper limit, equation (7) becomes

$$0.4\ r_{13\ min} \leq \frac{1}{0.7}\ d_o \leq r_{13\ max} \tag{8}$$

and

$$0.4 \frac{r_1}{1.4} \; 0.7 \leq d_o \leq 0.7 \frac{r_1}{1.3}$$

again, in other words,

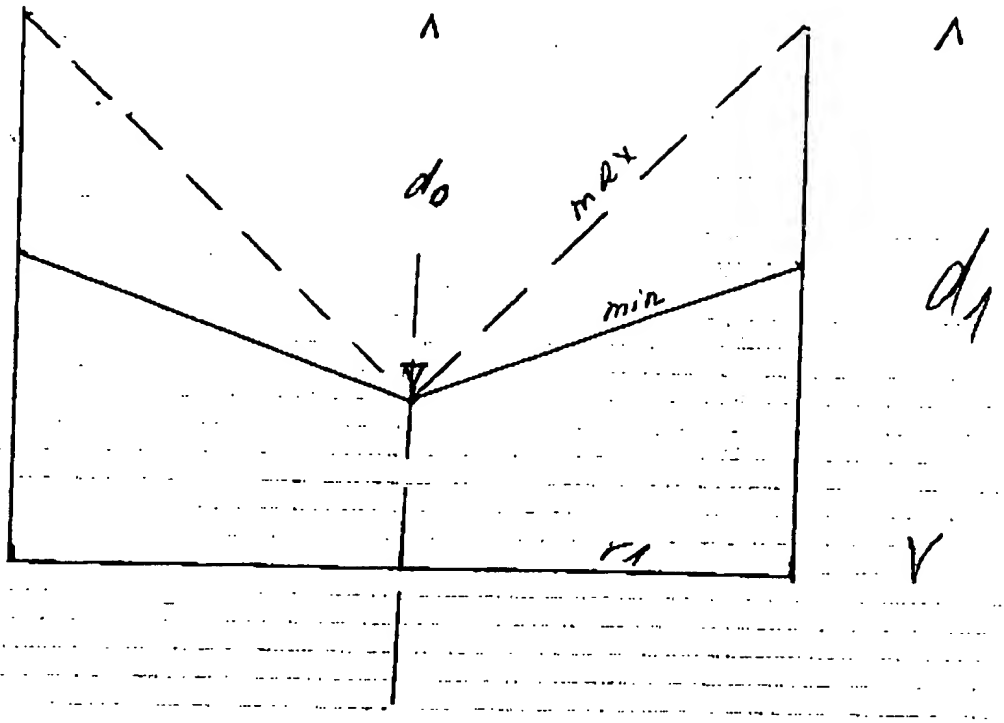
$$0.2 \; r_1 \leq d_o \leq 0.54 \; r_1$$

This taper range is that which is claimed in Claim 44.

Further declarant sayeth not.

Nov. 19th 2001
Date

W. Haag
Walter Haag



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